CHROMOSOME NUMBERS AND RELATIONSHIPS OF CERTAIN AFRICAN AND AMERICAN GENERA OF HAEMODORACEAE[1]

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ABSTRACT

Chromosome numbers of $n = 15$ are reported for *Barberetta aurea*, *Wachendorfia paniculata*, and *W. thyrsiflora*; $n =$ ca. 19–21 for *Dilatris pillansii*; $n = 24$ for *Lachnanthes caroliniana*; $n = 21$ for *Lophiola aurea*; and $n = 36$ for *Lanaria plumosa*, a genus of uncertain familial position sometimes assigned to Haemodoraceae. *Barberetta* and *Wachendorfia* are believed to be closely related, but the relationships of the other genera are unclear and indicate that further detailed study is merited.

The family Haemodoraceae has been variously circumscribed by different authors. A recent detailed study of familial limits recognized 14 genera (Geerinck, 1969; but see de Vos, 1956, and Hutchinson, 1973). The tribe Conostylideae contains the Australian genera *Anigozanthos*, *Conostylis*, and *Tribonanthes*. The tribe Haemodoreae contains the Australasian-Oceanic genera *Haemodorum* and *Phlebocarya*; the New World genera *Lophiola*, *Lachnanthes*, *Schiekia*, *Pyrrorhiza*, *Hagenbackia*, and *Xiphidium*; and the South African *Barberetta*, *Dilatris*, and *Wachendorfia*. The New World genera are monotypic; only *Barberetta* of the Old World genera is monotypic, with the others containing a few to many species. In South Africa, *Wachendorfia* is particularly variable and is in need of systematic study. Although chromosome counts are available for several species of the Conostylideae (Green, 1960), only a single chromosome count has been published for the considerably larger and more widespread Haemodoreae. This paper presents chromosome counts of two New World and three South African genera of Haemodoraceae. Because *Lanaria* has on occasion been referred to the Haemodoraceae, a chromosome count for it is also included here.

MATERIALS AND METHODS

During 1970–1971, living material or flower buds of various Haemodoraceae were collected by the author in South Africa and sent to the Botanical Garden of the University of California, Berkeley, where additional cytological material was obtained from cultivated specimens for microscopic study. North American Haemodoraceae were provided by R. K. Godfrey, grown at Berkeley, and preparations made from these plants for observation of microsporogenesis.

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TABLE 1. Chromosome numbers of Haemodoraceae. All localities for South African taxa are in the Cape Province. Collection numbers without name are the author's.

Taxon	Chromosome Number (n)	Locality
Barberetta aurea Harv.	15	Between Blinkwater and York, Natal: *7661.*
Dilatris pillansii Barker	ca. 19–21	Cape Point Nature Reserve: *7647.*
Lachnanthes caroliniana (Lam.) Dandy	24	Lanark Village, Franklin Co., Florida: *Godfrey 70922.*
Lanaria plumosa Ait.	36	Nr. Elgin: *7702.*
Lophiola aurea Ker-Gawl.	21	Nr. Sumatra, Liberty Co., Florida: *Godfrey 70990.*
Wachendorfia paniculata Burm. sens. lat.	15	Kapteinskloof: *7134.*
	15	Darling Reserve: *7162.*
	15	Kenilworth: *7268.*
	15	Mamre: *7308*
	15	Clanwilliam: *7409.*
	15	Nieuwoudtville: *7452.*
Wachendorfia thyrsiflora Burm.	ca. 15	Kirstenbosch: *7612.*
	ca. 15	Grabouw/Villiersdorp: *7615.*

RESULTS

Thirteen collections were examined of six species of Haemodoraceae and of *Lanaria plumosa.* Chromosome numbers of $n = 15$, ca. 15, ca. 19–21, 21, and 24 were obtained for the Haemodoraceae; $n = 36$ for *L. plumosa* (Table 1).

DISCUSSION

The only chromosome count previously reported for a member of the Haemodoreae is $n = 15$ for *Barberetta aurea* (Hilliard & Burtt, 1971). The few species of the Conostylideae examined have $n = 4, 5, 7, 8, 14$ (*Conostylis*) and 6 (*Anigozanthos*; Green, 1960). My count of $n = 15$ for *Barberetta aurea* confirms the earlier one and was obtained from plants collected in a locality different from that in which the plants studied by Hilliard and Burtt originated. *Barberetta* is, in my opinion, much more closely related to *Wachendorfia* than to *Dilatris. Barberetta* and *Wachendorfia* both have plicate leaves, orange flowers, enantiostyly, pigmented corms, and other morphological characters in common. This presumed relationship is further borne out by the occurrence of $n = 15$ in the two species of *Wachendorfia* examined. The collections attributed to *W. paniculata* are variable in a number of characteristics. It is possible that further study of *W. paniculata* sensu lato and its allies will result in the description of additional species.

The approximate count of $n = 19$–21 for *Dilatris pillansii* is dissimilar to the counts of $n = 15$ for *Wachendorfia* and *Barberetta*, genera that it also does not resemble closely in morphological characters. Robertson (1976) concluded that there is a close relationship between *Dilatris* and *Lachnanthes*. In overall vegetative aspect and in certain details of the inflorescence, the two genera are similar. Their probable close relationship is further supported by the occurrence of $n = 24$ in *Lachnanthes*, which, while not identical to the $n = 19$–21 recorded for *Dilatris pillansii*, is also clearly not based on the $x = 15$ of *Barberetta* and *Wachendorfia*. However, de Vos (1956), on the basis of embryological characters, concluded that *Wachendorfia* and *Dilatris* are rather closely related to each other, as well as to *Xiphidium* and *Anigonzanthos*.

The taxonomic position and relationships of *Lophiola* have been the subject of disagreement among various workers. Hutchinson (1973) placed the genus in the Conostylideae; Geerinck (1969) placed it in the Haemodoreae next to *Lachnanthes*. Robertson (1976) stated that *Lophiola* has little in common with other members of the Conostylideae but also said that despite the superficial similarities between *Lophiola* and *Lachnanthes*, the differences between them are numerous and "it seems doubtful" that they are related. The chromosome number of $n = 21$ for *Lophiola* would suggest a possible close relationship to *Dilatris* and perhaps even *Lachnanthes*, and a more distant relationship to *Wachendorfia* and *Barberetta*. On the basis of gross morphology and chromosome number, *Lophiola* seems more at home in the Haemodoreae than in the Conostylideae. De Vos (1963) has pointed out several anatomical and palynological similarities between *Lophiola* and *Lanaria*. The latter genus has been variously placed in Haemodoraceae, Liliaceae, and Tecophilaeaceae (Airy Shaw, 1973; Robertson, 1976). Its chromosome number of $n = 36$ does not clearly aid in supporting any of these familial assignments, although $n = 12$ is present in three genera of Tecophilaeaceae, including *Cyanella* of South Africa (Ornduff, 1979). However, $x = 6$ for the Australian haemodoraceous genus *Anigozanthos* as well (Green, 1960). On embryological grounds, de Vos (1961, 1963) suggested that *Lanaria* has a closer relationship with genera of the Tecophilaeaceae than with the Haemodoraceae, although she did not rule out possible relationship to certain genera of Liliaceae and Amaryllidaceae. The substantial and continuing disagreements concerning the limits of the Haemodoraceae and the relationships of the genera assigned to it indicate that the family merits additional detailed study.

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